The views expressed in this presentation are those of the authors and do not necessarily reflect the position of the Federal Reserve Board or the Federal Reserve System.
Higher trade barriers represent a policy challenge for EMs.
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How important?
Higher trade barriers represent a policy challenge for EMs. How important?

What are the quantitative implications of higher trade barriers for EMs?
Introduction

Higher trade barriers: A challenge for Emerging Markets (EMs)

- Higher trade barriers represent a policy challenge for EMs.
  → How important?

What are the quantitative implications of higher trade barriers for EMs?

→ Need for a theoretical framework → What type?

1. Traditional international macro models used to study EMs?
2. International trade models that exploit differences in comparative advantage?
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Fact: EMs more integrated into the global economy than ever
- EMs’ exposure to and role as propagators of shocks
Introduction
Higher trade barriers: A challenge for Emerging Markets (EMs)

- Higher trade barriers represent a policy challenge for EMs.
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What are the quantitative implications of higher trade barriers for EMs?
  → Need for a theoretical framework → What type?

1. Traditional international macro models used to study EMs?
2. International trade models that exploit differences in comparative advantage?

Fact: EMs more integrated into the global economy than ever
  - EMs’ exposure to and role as propagators of shocks
  → Data on aggregate trade flows and production structures push for a framework closer to (2)
Methodology
New Geography of Trade and higher trade barriers

1. Provide set of facts on agg. trade flows and production structure of EMs
   - New Geography of Trade (NGT) ⇒ unified and systematic

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   - Dynamic multi-country-sector-factor GE trade model with IO linkages
     ⇒ Ricardian-HO comp. adv. and consumption vs investment effects

Methodology

New Geography of Trade and higher trade barriers

1. Provide set of facts on agg. trade flows and production structure of EMs
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2. Propose model guided by facts to quantify effects of rising trade barriers
   - Dynamic multi-country-sector-factor GE trade model with IO linkages
     ⇒ Ricardian-HO comp. adv. and consumption vs investment effects

3. Take model to data consistent with NGT and quantify long-run effects of higher trade barriers on EMs
   - Two exercises with focus on EMs
     i. Global increase in trade barriers
     ii. Spillovers from trade war between AEs
     - Trade war: Charbonneau and Landry (2018)
1. Stylized Facts: The New Geography of Trade

→ Stylized facts mostly summarized as follows:

- **Intra-region, intra-industry trade**
- **Inter-region, inter-industry trade**

Diagram:

- **AE₁** to **AE₂** (Inter-region, inter-industry trade)
- **EM₁** to **EM₂** (Inter-region, inter-industry trade)
- **Intra-region, intra-industry trade**
2. Quantitative Exercises

→ Global increase in trade barriers:

- Sizable global negative effects (output and welfare), but EMs disproportionately affected.

- Effects on EMs are more heterogeneous.

- Approximately 1/2 of effects on output (welfare) driven by endogenous responses in investment.

- Redistribution of world exports toward EMs reduces welfare losses.
2. Quantitative Exercises

→ **Global increase in trade barriers:**
   - Sizable global negative effects (output and welfare), but EMs disproportionately affected.
   - Effects on EMs are more heterogeneous.
   - Approximately 1/2 of effects on output (welfare) driven by endogenous responses in investment.
   - Redistribution of world exports toward EMs reduces welfare losses.

→ **Spillovers - increase in trade barriers between AEs:**
   - Sizable spillovers → EMs increase output.
   - Lion’s share of spillovers from endogenous adjustment in diverted investment.
   - Increase in inequality in EMs.
   - Welfare effects are very heterogeneous across EMs.
The New Geography of Trade

Fact 1. Trade by EMs represents a significant share of world trade.
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Figure: EMs Export Share of World Exports

⇒ GE forces with EMs not considered as small open economies (SOEs)
The New Geography of Trade

Fact 2. EMs are on average more open than AEs, but there is substantial heterogeneity across countries.

Figure: EMs and AEs Trade Openness (exports as a share of GDP)
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Figure: EMs and AEs Trade Openness (exports as a share of GDP)

⇒ Heterogeneity in trade costs and openness
The New Geography of Trade

Fact 3. As a share of global trade, inter-regional trade has grown.

Figure: Intra- and Inter-region Trade Linkages (share of world exports)
The New Geography of Trade

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Figure: Intra- and Inter-region Trade Linkages (share of world exports)

⇒ Differences in comparative advantage and multiple sectors
**Fact 4.** As a share of global trade, intra-regional trade has increased between EMs and remains important between AEs, albeit declining.

**Figure:** Intra-region Trade (share of world exports)
The New Geography of Trade

Fact 4. As a share of global trade, intra-regional trade has increased between EMs and remains important between AEs, albeit declining.

Figure: Intra-region Trade (share of world exports)

⇒ Incorporate multiple countries
Fact 5. EMs produce and consume both intermediate and capital goods, but heterogeneously. (1/2)

Figure: EMs in Intermediate and Capital Goods Trade (share of category’s exports)

(a) Intermediate Goods

(b) Capital Goods
The New Geography of Trade

Fact 5. EMs produce and consume both intermediate and capital goods, but heterogeneously. (2/2)

Figure: Trade among EMs (share of category’s exports)

(a) Intermediate Goods

(b) Non-oil Commodities

(c) Capital Goods
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Figure: Trade among EMs (share of category’s exports)

(a) Intermediate Goods

(b) Non-oil Commodities

(c) Capital Goods

⇒ IO linkages, investment and production heterogeneity across EMs
The New Geography of Trade

Fact 6. Factor endowments are key to understand AE-EM trade.

Figure: Skill Bias of Net Factor Content of Trade

(a) Skill Bias of NFCT

(b) Regional Skill Bias of NFCT
The New Geography of Trade

Fact 6. Factor endowments are key to understand AE-EM trade.

Figure: Skill Bias of Net Factor Content of Trade

(a) Skill Bias of NFCT

(b) Regional Skill Bias of NFCT

⇒ Multiple factors of production
Time is discrete: $t = 0, 1, \ldots$

All economic agents have perfect foresight

$I$ countries indexed by $i$, $J$ sectors indexed by $j$

Country $i$ endowed with $U_{i,t}$ units of low-skill workers and $S_{i,t}$ units of high-skill workers in every $t$, and $K_{i,0}$ units of physical capital.

- Immobile across countries

Representative household in each country:

- Access to international financial markets: One-period bonds in zero net-supply
- Own physical capital and initial NFA position
Country $i$
Final consumption, investment or intermediates

Tier 1

Country $h$
Final consumption, investment or intermediates
A Quantitative Model of The New Geography of Trade
Technologies and Trade

Country $i$

Final consumption, investment or intermediates

$1 \cdots j \cdots J$

$Q^j_{i,t} = \left( \int_0^1 d^j_{i,t} \left( \omega^j \right)^{(\eta-1)/\eta} d\omega^j \right)^{\eta/(\eta-1)}$

Tier 1

Country $h$

Final consumption, investment or intermediates

$1 \cdots j \cdots J$

Tier 2

$\omega^j \cdots \omega^j \cdots$
A Quantitative Model of The New Geography of Trade
Technologies and Trade

Country $i$

Final consumption, investment or intermediates

1 $\cdots$ $j$ $\cdots$ $J$

$Q_{i,t}^j = \left( \int_0^1 d_{i,t}^j \left( \omega^j \right)^{(\eta-1)/\eta} d\omega^j \right)^{\eta/(\eta-1)}$

Country $h$

Final consumption, investment or intermediates

1 $\cdots$ $j$ $\cdots$ $J$

Tier 1

$\tau_{ih,t}$

Tier 2

$\tau_{hi,t}$
Country $i$

Final consumption, investment or intermediates

$Q_{i,t}^j = \left( \int_0^1 d\omega^j \left( \omega^j \right)^{(\eta-1)/\eta} \frac{d\omega^j}{\omega^j} \right)^{\eta/(\eta-1)}$

Country $h$

Final consumption, investment or intermediates

Tier 1

Tier 2

$U_{i,t}, S_{i,t}, K_{i,t}$

$U_{h,t}, S_{h,t}, K_{h,t}$
A Quantitative Model of The New Geography of Trade
Technologies and Trade

Country $i$

Final consumption,
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1 \cdots j \cdots J

Tier 1

$Q_{i,t}^j = \left( \int_0^1 d_{i,t}^j (\omega_j)^{(\eta-1)/\eta} \ d\omega_j \right)^{\eta/(\eta-1)}$

$Q_{i,t}^j (\omega_j)^{(\eta-1)/\eta} d\omega_j$

Tier 2

$V_{i,t}^j (\omega_j) = \left[ (\gamma_i^j)^{1/\sigma} u_{i,t} (\omega_j) \frac{\sigma-1}{\sigma} + (1 - \gamma_i^j)^{1/\sigma} Z_{i,t} (\omega_j) \frac{\sigma-1}{\sigma} \right] \frac{\sigma}{\sigma-1}$

$V_{i,t}^j (\omega_j) = \left[ (\varphi_i^j)^{1/\rho} k_{i,t} (\omega_j) \frac{\rho-1}{\rho} + (1 - \varphi_i^j)^{1/\rho} s_{i,t} (\omega_j) \frac{\rho-1}{\rho} \right] \frac{\rho}{\rho-1}$

Country $h$

Final consumption,
investment or intermediates

1 \cdots j \cdots J

$U_{i,t}$ $S_{i,t}$ $K_{i,t}$

$U_{h,t}$ $S_{h,t}$ $K_{h,t}$

HO
A Quantitative Model of The New Geography of Trade
Technologies and Trade

Country $i$

Final consumption, investment or intermediates

$1 \cdots j \cdots J$

$Q_{i,t}^j = \left( \int_0^1 d_{i,t}^j (\omega^j)^{(\eta-1)/\eta} d\omega^j \right)^{\eta/(\eta-1)}$

$\omega^j$

Tier 1

$U_{i,t} \quad S_{i,t} \quad K_{i,t}$

Tier 2

$U_{h,t} \quad S_{h,t} \quad K_{h,t}$

Country $h$

Final consumption, investment or intermediates

$1 \cdots j \cdots J$

$q_{i,t}^j (\omega^j) = x_{i,t}^j (\omega^j) \left[ V_{i,t} (\omega^j) \right]^{\nu_i^j} \left[ M_{i,t}^j (\omega^j) \right]^{1-\nu_i^j}$

$\tau_{ih,t}^j$

$\tau_{hi,t}^j$

$V_{i,t}^j (\omega^j) = \left[ (\gamma_i^j)^{1/\rho} u_{i,t} (\omega^j)^{\sigma-1/\rho} + (1-\gamma_i^j)^{1/\rho} Z_{i,t} (\omega^j)^{\sigma-1/\rho} \right]^{\sigma-1/\rho}$

$Z_{i,t}^j (\omega^j) = \left[ (\phi_i^j)^{1/\rho} k_{i,t} (\omega^j)^{\rho-1/\rho} + (1-\phi_i^j)^{1/\rho} s_{i,t} (\omega^j)^{\rho-1/\rho} \right]^{\rho-1/\rho}$

$M_{i,t}^j (\omega^j) = \prod_{m=1}^J D_{i,t}^{j,m} (\omega^j)^{\alpha_i^{j,m}}$
A Quantitative Model of The New Geography of Trade
Technologies and Trade

Country $i$
Final consumption, investment or intermediates

$Q_{i,t}^j = \left( \int_0^1 d_\omega^j \left( \omega^j \right)^{(\eta-1)/\eta} \ d\omega^j \right)^{\eta/(\eta-1)}$

$T^j_{ih,t}$

Tier 1

$U_{i,t}$ $S_{i,t}$ $K_{i,t}$
Ricardian

Country $h$
Final consumption, investment or intermediates

$U_{h,t}$ $S_{h,t}$ $K_{h,t}$

$V_{i,t}^j (\omega^j) = \left[ \left( \gamma_i^j \right)^{\frac{1}{\sigma}} \ u_{i,t}^j (\omega^j) \right]^{\frac{\sigma-1}{\sigma}} + \left( 1 - \gamma_i^j \right)^{\frac{1}{\rho}} \ Z_{i,t}^j (\omega^j) \right]^{\frac{\sigma-1}{\sigma}}$

$M_{i,t}^j (\omega^j) = \prod_{m=1}^J D_{i,t}^{j,m} (\omega^j) q_{i,t}^{j,m}$

$F_{i,t}^j (x|t) = \Pr \left[ x_{i,t}^j \leq x \right] = e^{-T_{i,t}^{j}x^{j}}$

$Z_{i,t}^j (\omega^j) = \left[ \left( \phi_i^j \right)^{\frac{1}{\rho}} \ k_{i,t}^j (\omega^j) \right]^{\frac{\rho-1}{\rho}} + \left( 1 - \phi_i^j \right)^{\frac{1}{\sigma}} \ s_{i,t}^j (\omega^j) \right]^{\frac{\rho-1}{\rho}}$
A Quantitative Model of The New Geography of Trade

Households

Household in $i$ chooses $\{K_{i,t+1}, B_{i,t+1}, \{C_{i,t}^j\}_j, \{X_{i,t}^j\}_j\}_{t=0,1,...}$ to maximize

$$\sum_{t=0}^{\infty} \beta^t \ln \left( \prod_{j=1}^{J} (C_{i,t}^j)^{\mu_{i}^j} \right)$$

subject to

$$\sum_{j=1}^{J} P_{i,t}^j (C_{i,t}^j + X_{i,t}^j) + B_{i,t+1} + \frac{\psi}{2} (B_{i,t+1} - \bar{B}_i)^2 = w_{i,t}^U U_{i,t} + w_{i,t}^S S_{i,t} + r_{i,t} K_{i,t} + R_t B_{i,t},$$

$$K_{i,t+1} = \xi_{i,t} \prod_{j=1}^{J} (X_{i,t}^j)^{\chi_{i}^j} + (1 - \delta) K_{i,t},$$

where $K_{i,0}, W_{i,0} = R_0 B_{i,0}$ are given and $\mu_{i}^j, \chi_{i}^j > 0$ and $\sum_{j=1}^{J} \mu_{i}^j = \sum_{j=1}^{J} \chi_{i}^j = 1.$

Market Clearing Conditions  Equilibrium and Steady State Conditions
Taking the Model to the Data

- Calibrate model to steady state in 2016
  - If data not available for period, use most recent available.
- \( I = 31 \), 30 core countries and ROW
  - **AEs:** AUS, AUT, DEU, CAN, DNK, ESP, FIN, FRA, ITA, GRC, IRL, JPN, KOR, NLD, NZL, NOR, PRT, SWE, GBR, USA.
  - **EMs:** ARG, BRA, CHL, CHN, HUN, IDN, IND, MEX, TUR, ZAF, ROW.
- 40 sectors: 20 tradable and 20 non-tradable.
- Data sources include UNCOMTRADE, WIOD, UN National Accounts, etc.
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→ **Steps:**

1. Calibrate *time-invariant parameters* (\( \mu^j_i \), \( \chi^j_i \) among others) and *exogenous observable endowments* (\( U_{i,t}, S_{i,t} \)).
2. Invert model to recover *exogenous unobservable shifters*:
   - *bilateral trade barriers*: \( \tau^j_{ih,t} \)
   - *sectoral productivities*: \( T^j_{i,t} \)
   - *investment efficiencies*: \( \zeta^j_{i,t} \)
Taking the Model to the Data

Exogenous Shifters: Trade Barriers Across Countries

\[
\tau_{ih,t}^j = \frac{P_{i,t}^j}{P_{h,t}^j} \left( \frac{\pi_{hh,t}^j}{\pi_{ih,t}^j} \right)^{1/\theta^j}
\]

\(\pi_{ih,t}^j\): share of exp. by \(i\) on sector \(j\) goods produced in \(h\)

Figure: Trade Costs Across Countries: Median and 25th-75th percentile ranges

(a) Exporting Costs

(b) Importing Costs
Taking the Model to the Dara

Exogenous Shifters: Trade Barriers Across Sectors

\[ \tau_{ih,t}^j = \frac{P_{i,t}^j}{P_{h,t}^j} \left( \frac{\pi_{ih,t}^j}{\pi_{ih,t}^j} \right)^{1/\theta^j} \]

\( \tau_{ih,t}^j \): share of exp. by \( i \) on sector \( j \) goods produced in \( h \)

**Figure:** Sectoral Trade Costs: Median and 25th-75th percentile ranges

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Reyes-Heroles, Traiberman & Van Leemput  EMs, New Geography of Trade and Barriers  July 24, 2019  18 / 26
Two main counterfactual exercises:

1. Global increase in bilateral trade barriers
2. Spillovers: Increase in bilateral barriers between AEs

Exogenous changes in trade barriers in isolation

→ Baseline $T_{i,t}$, $\xi_{i,t}$, $U_{i,t}$ and $S_{i,t}$ unchanged.

Solve for new steady state equilibrium $w^U_{i,t}$, $w^S_{i,t}$ and $r_{i,t}$ such that the labor market and capital markets clear.

Outcomes of interest: focus on macroeconomic outcomes including GDP, welfare, relative factor prices and aggregate trade flows.
Counterfactual Exercises
Global Increase in Trade Barriers (1/3)

Figure: Global Trade War: Macroeconomic Effects

(a) Gross Domestic Product

(b) Consumption
Counterfactual Exercises
Global Increase in Trade Barriers (2/3)

Figure: Global Trade War: Macroeconomic Effects

(a) Relative Price of X: $P_i^X / P_i^C$

(b) Skill Premium: $w_i^S / w_i^U$
Counterfactual Exercises
Global Increase in Trade Barriers (3/3)

Figure: Global Trade War: Macroeconomic Effects

(a) World Exports by Sector

(b) Regional Exports
Counterfactual Exercises
Spillovers: Increase in Trade Barriers between AEs (1/3)

Figure: Trade War between Advanced Economies: Macroeconomic Effects

(a) Gross Domestic Product

(b) Consumption
### Counterfactual Exercises

**Spillovers: Increase in Trade Barriers between AEs (2/3)**

**Figure:** Trade War between Advanced Economies: Macroeconomic Effects

(a) **Relative Price of X:** $P_i^X / P_i^C$

(b) **Skill Premium:** $w_i^S / w_i^U$

[Graphs showing the relative price and skill premium changes for various countries under different adjustment scenarios.]
Counterfactual Exercises
Spillovers: Increase in Trade Barriers between AEs (3/3)

Figure: Trade War between Advanced Economies: Macroeconomic Effects

(a) World Exports by Sector

(b) Regional Exports
Conclusions

1. Key role of EMs in New Geography of Trade

2. Role ⇒ sizable effects of increases in trade barriers for EMs even when symmetric and EMs not modeled fundamentally different (mechanisms) from AEs

3. Relevance of investment channel

4. Spillover effects can be sizable
Conclusions

1. Key role of EMs in New Geography of Trade

2. Role ⇒ sizable effects of increases in trade barriers for EMs even when symmetric and EMs not modeled fundamentally different (mechanisms) from AEs

3. Relevance of investment channel

4. Spillover effects can be sizable

Thank You!
Nontradable goods and factor markets clearing:

\[
C_i^j + X_i^j + \sum_{k=1}^{J} D_{i,t}^{k,j} = Q_i^j \text{ for all } j,
\]

\[
\sum_{j=1}^{J} U_i^j = U_{i,t}, \quad \sum_{j=1}^{J} S_i^j = S_{i,t} \text{ and } \sum_{j=1}^{J} K_i^j = K_{i,t}.
\]

Let \( Y_{i,t}^j \) denote the value of production, then:

\[
Y_i^j = \sum_{h=1}^{I} \pi_{hi,t}^j E_{h,t}^j \text{ for all } j.
\]

Country-specific resource constraint:

\[
B_{i,t+1} - R_t B_{i,t} = \sum_{j=1}^{J} \left( Y_i^j - E_i^j \right).
\]

International financial markets clear: \( \sum_{i=1}^{I} B_{i,t+1} = 0 \) for all \( t \).
Let $t$ be such that the world economy is in steady state. Then:

- **Sectoral prices** in each $j$ ($c_{i,t}^j$: cost input bundle):

  $$P_{i,t}^j = \Gamma \left[ \Phi_{i,t}^j \right]^{-\frac{1}{\theta}}$$
  where $$\Phi_{i,t}^j = \sum_{h=1}^{l} T_{h,t}^j \left[ c_{h,t}^j \tau_{ih,t}^j \right]^{-\theta}$$

- **Share of total expenditure in $j$ on goods produced in $h$**: ($E_{i,t}^j \equiv P_{i,t}^j Q_{i,t}^j$)

  $$\pi_{ih,t}^j \equiv E_{ih,t}^j / E_{i,t}^j = T_{h,t}^j \left( c_{h,t}^j \tau_{ih,t}^j \right)^{-\theta} / \Phi_{i,t}^j$$

  → Multisector version of gravity equation.

- **Final consumption and investment prices in $i$**:

  $$P_{i,t}^C = \kappa_i^C \prod_{j=1}^{J} \left( P_{i,t}^j \right)^{\mu_{i,t}^j} \quad \text{and} \quad P_{i,t}^X = \frac{\kappa_i^X}{\xi_{i,t}} \prod_{j=1}^{J} \left( P_{i,t}^j \right)^{\chi_{i,t}^j}$$

- **Steady state $K_{i,t}$ in each $i$**:

  $$\frac{r_{i,t}}{P_{i,t}^X} = \frac{1}{\beta} - (1 - \delta) \quad \text{and} \quad \delta K_{i,t} = X_{i,t}.$$
Taking the Model to the Data

Sectors

<table>
<thead>
<tr>
<th>Tradable</th>
<th>Non-Tradable</th>
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<tbody>
<tr>
<td>1 Agriculture</td>
<td>21 Electricity</td>
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<tr>
<td>2 Mining</td>
<td>22 Construction</td>
</tr>
<tr>
<td>3 Food</td>
<td>23 Retail</td>
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<td>4 Textile</td>
<td>24 Hotels</td>
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<tr>
<td>5 Wood</td>
<td>25 Land transport</td>
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<td>6 Paper</td>
<td>26 Water transport</td>
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<tr>
<td>7 Petroleum</td>
<td>27 Air transport</td>
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<td>8 Chemicals</td>
<td>28 Aux transport</td>
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<tr>
<td>9 Plastic</td>
<td>29 Post</td>
</tr>
<tr>
<td>10 Minerals</td>
<td>30 Finance</td>
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<table>
<thead>
<tr>
<th>Tradable</th>
<th>Non-Tradable</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Basic metals</td>
<td>31 Real estate</td>
</tr>
<tr>
<td>12 Metal products</td>
<td>32 Renting machinery</td>
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<tr>
<td>13 Machinery nec</td>
<td>33 Computer</td>
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<td>14 Office</td>
<td>34 R&amp;D</td>
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<tr>
<td>15 Electrical</td>
<td>35 Other business</td>
</tr>
<tr>
<td>16 Communication</td>
<td>36 Public</td>
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<td>17 Medical</td>
<td>37 Education</td>
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<tr>
<td>18 Auto</td>
<td>38 Health</td>
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<tr>
<td>19 Other transport</td>
<td>39 Other services</td>
</tr>
<tr>
<td>20 Other</td>
<td>40 Private</td>
</tr>
</tbody>
</table>

Table: Sectors
Table: Time-invariant Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Variable</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\nu^j_i$</td>
<td>—</td>
<td>Value added to gross output ratio</td>
<td>Data: OECD Stan, WIOD (SEA), UNs’ INDSTAT2 and the NAs</td>
</tr>
<tr>
<td>$\alpha^i_{j,k}$</td>
<td>—</td>
<td>Input-output coefficients</td>
<td>Data: WIOD 2016 release and OECD</td>
</tr>
<tr>
<td>$\gamma^i_j, \phi^j_i$</td>
<td>—</td>
<td>Factor shares in value added</td>
<td>Data: WIOD 2016 release and model</td>
</tr>
<tr>
<td>$\theta^j_i$</td>
<td>—</td>
<td>Trade elasticities</td>
<td>Caliendo and Parro (2015)</td>
</tr>
<tr>
<td>$\sigma, \rho$</td>
<td>1.67, 0.67</td>
<td>Elasticities of substitution across factors</td>
<td>Parro (2013)</td>
</tr>
<tr>
<td>$\eta$</td>
<td>2</td>
<td>Elasticity of substitution in tradable goods</td>
<td>Standard in literature</td>
</tr>
<tr>
<td>$\beta$</td>
<td>0.95</td>
<td>Discount factor</td>
<td>In line with annual data</td>
</tr>
<tr>
<td>$\delta$</td>
<td>0.05</td>
<td>Depreciation rate</td>
<td>In line with annual data</td>
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<tr>
<td>$\mu^i_j$</td>
<td>—</td>
<td>Sectoral consumption expenditure shares</td>
<td>Data: WIOD 2016 release</td>
</tr>
<tr>
<td>$\chi^j_i$</td>
<td>—</td>
<td>Sectoral investment expenditure shares</td>
<td>Data: WIOD 2016 release</td>
</tr>
</tbody>
</table>
Taking the Model to the Data

Time-invariant Parameters: Consumption and Investment Shares

**Figure:** Investment ($\chi^i_j$) and Consumption ($\mu^i_j$) Sectoral Shares in Tradable Sectors and Foreign Trade Share
Taking the Model to the Data
Sectoral Productivities Across Countries

Figure: Sectoral Productivities: Median and 25th-75th percentile ranges, relative to the U.S.

(a) Tradable Sectors

(b) Non-tradable Sectors